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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/581,060	05/30/2006	Masaharu Kawakubo	127873	6788
25944 7590 12/08/2008 OLIFF & BERRIDGE, PLC P.O. BOX 320850 ALEXANDRIA, VA 22320-4850				
EXAMINER				
RIDDLE, CHRISTINA A				
ART UNIT		PAPER NUMBER		
4175				
MAIL DATE		DELIVERY MODE		
12/08/2008		PAPER		

**Please find below and/or attached an Office communication concerning this application or proceeding.**

The time period for reply, if any, is set in the attached communication.

# Office Action Summary

**Application No.**

10/581,060

**Applicant(s)**

KAWAKUBO ET AL.

**Examiner**

Christina Riddle

**Art Unit**

4175

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --  
**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

**Status**

- 1) ☐ Responsive to communication(s) filed on 27 June 2006.  
2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.  
3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

**Disposition of Claims**

- 4) ☒ Claim(s) 31-62 is/are pending in the application.  
4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.  
5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.  
6) ☒ Claim(s) 31-62 is/are rejected.  
7) ☒ Claim(s) 40, 41, 52 is/are objected to.  
8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

**Application Papers**

- 9) ☐ The specification is objected to by the Examiner.  
10) ☒ The drawing(s) filed on 30 May 2006 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).  
11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

**Priority under 35 U.S.C. § 119**

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).  
a) ☒ All b) ☐ Some \* c) ☐ None of:  
1. ☒ Certified copies of the priority documents have been received.  
2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.  
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

**Attachment(s)**

- 1) ☒ Notice of References Cited (PTO-892)  
2) ☐ Notice of Draftperson's Patent Drawing Review (PTO-948)  
3) ☒ Information Disclosure Statement(s) (PTO-85/86)  
Paper No(s)/Mail Date 7/31/2006, 9/18/2006  
4) ☐ Interview Summary (PTO-413)  
Paper No(s)/Mail Date \_\_\_\_\_  
5) ☐ Notice of Inventor's Patent Application  
6) ☐ Other: \_\_\_\_\_

## **DETAILED ACTION**

### ***Claim Objections***

1. Claim 40 is objected to because of the following informalities: the stated dependency of the claim currently reads "using the exposure method of Claim 1", page 6, claim 40, line 3. The examiner suggests correcting the claim language to cite dependency to claim 31. Appropriate correction is required.
2. Claim 41 is objected to because of the following informalities: "at least one of the number of new measurement divided areas," page 6, claim 41, line 14 lacks proper antecedent basis. The examiner suggests correcting the claim language to read "a number of new measurement divided areas. " Appropriate correction is required.
3. Claim 52 is objected to because of the following informalities: the phrase "said determining unit determines said new measurement divide areas" on page 10, claim 52, line 2 should be corrected such that the word "divide" reads "divided". Appropriate correction is required.

### ***Claim Rejections - 35 USC § 112***

4. The following is a quotation of the second paragraph of 35 U.S.C. 112:  

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

5. Claims 31-62 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention. The claims are generally narrative and indefinite, failing to conform with current U.S. practice. They appear to be a literal translation into English from a foreign document and are replete with grammatical and idiomatic errors. For instance, the phrase "the necessity of update of correction information" in claim 31, line 15 is not in line with general English written communication practices. The length of the claims in addition to the lack of clarity in writing does not enable one of ordinary skill in the art at the time of the invention to accurately determine the metes and bounds of the claim (see MPEP 2173.02).

#### ***Claim Rejections - 35 USC § 101***

6. 35 U.S.C. 101 reads as follows:

Whoever invents or discovers any new and useful process, machine, manufacture, or composition of matter, or any new and useful improvement thereof, may obtain a patent therefor, subject to the conditions and requirements of this title.

The USPTO "Interim Guidelines for Examination of Patent Applications for Patent Subject Matter Eligibility" (Official Gazette notice of 22 November 2005), Annex IV, reads as follows:

Descriptive material can be characterized as either "functional descriptive material" or "nonfunctional descriptive material." In this context, "functional descriptive material" consists of data structures and computer programs which impart functionality when employed as a computer component. (The definition of "data structure" is "a physical or logical relationship among data elements, designed to support specific data manipulation functions." The New IEEE Standard Dictionary of Electrical and Electronics Terms 308 (5th ed. 1993).) "Nonfunctional descriptive material" includes but is not limited to music, literary works and a compilation or mere arrangement of data.

When functional descriptive material is recorded on some computer-readable medium it becomes structurally and functionally interrelated to the medium and will be statutory in most cases since use of technology permits the function of the descriptive material to be realized. Compare *In re Lowry*, 32 F.3d 1579, 1583-84, 32 USPQ2d 1031, 1035 (Fed. Cir. 1994) (claim to data structure stored on a computer readable medium that increases computer efficiency held statutory) and *Warmerdam*, 33 F.3d at 1360-61, 31 USPQ2d at 1759 (claim to computer having a specific data structure stored in memory held statutory product-by-process claim) with *Warmerdam*, 33 F.3d at 1361, 31 USPQ2d at 1760 (claim to a data structure per se held nonstatutory).

In contrast, a claimed computer-readable medium encoded with a computer program is a computer element which defines structural and functional interrelationships between the computer program and the rest of the computer which permit the computer program's functionality to be realized, and is thus statutory. See *Lowry*, 32 F.3d at 1583-84, 32 USPQ2d at 1035.

Claims 61 and 62 are rejected under 35 U.S.C. 101 because the claimed invention is directed to non-statutory subject matter. Claims 61 and 62 define a computer program embodying functional descriptive material. However, the claim does not define a "computer-readable medium or computer-readable memory" and is thus non-statutory for that reason (i.e., "When functional descriptive material is recorded on some computer-readable medium it becomes structurally and functionally interrelated to the medium and will be statutory in most cases since use of technology permits the function of the descriptive material to be realized" – Guidelines Annex IV). The scope of the presently claimed invention encompasses products that are not necessarily computer readable, and thus NOT able to impart any functionality of the recited program. The examiner suggests amending the claim(s) to embody the program on "computer-readable medium" or equivalent; assuming the specification does NOT define the computer readable medium as a "signal", "carrier wave", or "transmission

medium" which are deemed non-statutory. Any amendment to the claim should be commensurate with its corresponding disclosure.

***Claim Rejections - 35 USC § 103***

7. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

8. Claims 31-35, 37-44, 46-52, 54-56, and 60- 62 are rejected under 35 U.S.C. 103(a) as being unpatentable over Kikuchi (US 2002/0042664 A1, using US 2004/0126004 A1 as a translation for the drawings) in view of Irie et al. (US Patent No. 5,525,808).

Note: For the purpose of readability, the claim language discussion for each claim will be addressed in reference to claim number. The motivation statements will be provided after the claim limitation discussion for all related method claims is completed.

9. Regarding claims 31 and 61, Kikuchi teaches a first process in which estimate values of positional information used to align each of a plurality of divided areas on a photosensitive object with a predetermined point are calculated by a statistical computation, using actual measurement values of positional information of a plurality of specific divided areas selected from said plurality of divided areas on said photosensitive object (Figure 5, step 310 and 320 as well as page 17, paragraph [185], and page 19, paragraph [209], divided areas on a photosensitive object are "shot areas"); and a second process in which with respect to a plurality of measurement divided areas on said photosensitive object including at least said plurality of specific divided areas, a non-linear component of positional deviation amount from an individual fiducial position (Figure 2, FM, reference mark or fiducial position is also inherent to and necessary for alignment) of each of said plurality of measurement divided areas is calculated respectively at predetermined intervals (see Figure 5, step 306 and page 19, paragraph [0208]), based on an actual measurement value of positional information of each of said plurality of measurement divided areas and on each of said estimate values (Figure 5, steps 314 and 318 and pages 19-20, paragraph [203]).

Kikuchi fails to teach that judgment is made about the necessity of update of correction information based on magnitude of one of said non-linear component of positional deviation amount calculated of each of said plurality of measurement divided areas and a variation amount of the non-linear component,

said correction information being used to correct a non-linear component of positional deviation amount from an individual fiducial position of each of said plurality of divided areas on said photosensitive object.

However, Irie et al. teaches that judgment is made about the necessity of update of correction information based on magnitude of one of said non-linear component of positional deviation amount calculated of each of said plurality of measurement divided areas and a variation amount of the non-linear component, said correction information being used to correct a non-linear component of positional deviation amount from an individual fiducial position of each of said plurality of divided areas on said photosensitive object (Figure 16A, steps 118 - 124 in which the nonlinear alignment errors are determined and the average error and standard deviation for all shots are determined. Based on the positional deviation amount and standard deviation, or variation amount, the judgment is made to update the correction information or calculation. Step 120 particularly shows a judgment or determination in the necessity to update correction information based on accuracy. Also see column 40, lines 59-62 and column 41, lines 9-28.).

Regarding claim 32, Kikuchi, as detailed in claim rejection 31, further teaches a third process in which an update processing to update said correction information is performed when it is judged that update is necessary in said second process (Figure 13, step 432 and see page 24, paragraph [282] line "second correction map" is updated in memory in place of the first correction



map); and a fourth process in which exposure is performed controlling a position of said photosensitive object based on the estimate value of positional information of each of said plurality of divided areas and said correction information that is latest (Figure 13, step 440 and page 25, paragraph [290]).

Regarding claim 37, Kikuchi, as detailed in claim rejection 31, also discloses the method wherein as said plurality of measurement divided areas on said photosensitive object, only said plurality of specific divided areas can be designated (Figure 5, steps 306 and 320, specific divided areas are measured (8 shots under the normal EGA measurement method) and position coordinates are calculated for all areas).

Regarding claim 38, Kikuchi, as detailed in claim rejection 31, further teaches the method wherein as said plurality of measurement divided areas on said photosensitive object, at least a part of remaining divided areas can be designated in addition to said plurality of specific divided areas (Figure 5, steps 308 and 310, all specific divided areas are measured and position coordinates are calculated for all areas).

Regarding claim 39, Kikuchi, as detailed in claim rejection 31, also teaches that said correction information is one of a correction map and a correction function (Figure 9, step 340, and Figure 12, step 412).

For claims 31-32, 37-39, and 61, it would have been obvious to one skilled in the art at the time of the invention to have included the capacity of judging of

whether updated correction information is needed as shown by Irie et al. with the method of calculating positional information errors of Kikuchi since, as shown by Irie et al., a method of judging whether to update correction information is commonly done to improve throughput while ensuring accuracy in alignment (column 4, lines 56-61).

Apparatus claim 50 is inherent to the method claim 31 and 32, and apparatus claim 54 is inherent to the combination of method claims 37 and 38 rejected above. Furthermore, apparatus claim 55 is inherent to the method of claim 39,

Device manufacturing claim 40 is inherent to the method claim 31 since an exposure method as described above would necessarily be performed either continuously (while one photosensitive object or substrate is exposed) or intermittently (a case in which one photosensitive object is exposed and subsequently another is exposed with an infinitesimal amount of time separating the two exposures). That is, any exposure apparatus performing the claimed method would necessarily be capable of performing the method at times as well as being in a non-exposing state at times in which the equipment is either preparing operation or just ending operation or in need of maintenance. Thus, the device manufacturing claim 40 is inherent to the method of exposure described above.

10. Regarding claim 33, Kikuchi, as detailed in claim rejection 31, does not disclose wherein in said third process, when the update processing of said correction information is performed, among said plurality of divided areas, at least a part of remaining divided areas excluding said plurality of measurement divided areas are to be new measurement divided areas, and said correction information is updated using a non-linear component of positional deviation amount from said individual fiducial position of each of said plurality of divided areas calculated based on actual measurement values of positional information of all measurement divided areas including the new measurement divided areas and on said estimate values.

However, Irie et al. discloses that in said third process, when the update processing of said correction information is performed, among said plurality of divided areas, at least a part of remaining divided areas excluding said plurality of measurement divided areas are to be new measurement divided areas, and said correction information is updated using a non-linear component of positional deviation amount from said individual fiducial position of each of said plurality of divided areas calculated based on actual measurement values of positional information of all measurement divided areas including the new measurement divided areas and on said estimate values (Figures 17-18 and column 31, lines 8-25).

Regarding claim 34, Kikuchi, as detailed in claim 33, fails to disclose that said new measurement divided areas are determined based on evaluation

results of said non-linear component of positional deviation amount of each of said plurality of divided areas included in said correction information before update.

However, Irie et al. discloses that said new measurement divided areas are determined based on evaluation results of said non-linear component of positional deviation amount of each of said plurality of divided areas included in said correction information before update (column 31, lines 8-25, the accuracy of superposition in the alignment mode is calculated).

Regarding claim 35, Kikuchi, as detailed in claim 33, fails to disclose that said new measurement divided areas are determined based on evaluation results of one of said non-linear component of positional deviation amount of each of said plurality of measurement divided areas calculated in said second process and a variation amount of the non-linear component.

However, Irie et al. teaches that said new measurement divided areas are determined based on evaluation results of one of said non-linear component of positional deviation amount of each of said plurality of measurement divided areas calculated in said second process and a variation amount of the non-linear component (column 31, lines 8-10 where  $|X|$  is the positional deviation amount of each of said plurality of measurement divided areas calculated in the second process, and  $3\sigma$  is the variation amount of the non-linear component).

Regarding claims 41 and 62, Kikuchi teaches a process in which estimate values of positional information used to align each of a plurality of divided areas

on a photosensitive object with a predetermined point are calculated by a statistical computation, using actual measurement values of positional information of a plurality of specific divided areas selected from said plurality of divided areas on said photosensitive object (Figure 5, step 310 and 320 as well as page 17, paragraph [185], and page 19, paragraph [209], divided areas on a photosensitive object are "shot areas"); a process in which with respect to a plurality of measurement divided areas on said photosensitive object including at least said plurality of specific divided areas, a non-linear component of positional deviation amount from an individual fiducial position of each of said plurality of measurement divided areas obtained from each actual measurement value of positional information and each of said estimate values is evaluated at predetermined intervals (Figure 5, steps 314 and 318 and pages 19-20, paragraph [203]). Kikuchi further teaches a process in which exposure is performed controlling a position of said photosensitive object based on the estimate value of positional information of each of said plurality of divided areas and said correction information after update (Figure 13, step 440 and page 25, paragraph [290]).

However, Kikuchi fails to teach a process in which at least one of the number of new measurement divided areas to be added and an arrangement thereof is determined based on the evaluation results; and further a process in which correction information related to a non-linear component of positional deviation amount from an individual fiducial position of each of said plurality of

divided areas on said photosensitive object is updated, using said non-linear component of positional deviation amount of each of said plurality of divided areas on said photosensitive object, said non-linear component of positional deviation amount being calculated based on actual measurement values of positional information of all measurement divided areas including said new measurement divided areas and on said estimate values.

Irie et al. teaches a process in which at least one of the number of new measurement divided areas to be added and an arrangement thereof is determined based on the evaluation results (column 31, lines 8-25 and lines 35-39, new shots are added when a desired accuracy is required and not satisfied based on the calculation of the accuracy. Further, an arrangement of the new shot areas is determined based on the addition of new shot areas.); and further a process in which correction information related to a non-linear component of positional deviation amount from an individual fiducial position of each of said plurality of divided areas on said photosensitive object is updated, using said non-linear component of positional deviation amount of each of said plurality of divided areas on said photosensitive object, said non-linear component of positional deviation amount being calculated based on actual measurement values of positional information of all measurement divided areas including said new measurement divided areas and on said estimate values (Figure 16A, steps 118 - 124 in which the non-linear alignment errors are determined and the average error and standard deviation for all shots are determined. Based on the

positional deviation amount and standard deviation, or variation amount, the judgment is made to update the correction information or calculation—step 120. Also see column 40, lines 59-62 and column 41, lines 9-28.).

Regarding claim 42, Kikuchi, as detailed in claim rejection 41, also teaches the evaluation of said non-linear component of positional deviation amount of each of said plurality of measurement divided areas is performed, taking into consideration at least one of magnitude and a dispersion degree of said non-linear component of positional deviation amount of each of said plurality of measurement divided areas in said correction information before update (page 17, paragraphs [189]-[190] and equation 8. The positional deviation amount vectors  $r_k$  include both the magnitude of deviation and dispersion degree—normally termed “direction”—of each respective shot area. The non-linear error of the wafer is composed of the non-linear error of the measured divided areas.).

Regarding claim 43, Kikuchi, as detailed in claim rejection 41, further teaches the evaluation of said non-linear component of positional deviation amount of each of said plurality of measurement divided areas is performed, using a predetermined evaluation function (page 17, paragraph [187] to compute the non-linear component of positional deviation amount of entire wafer, each positional deviation amount for all shot areas is taken into account.).

Regarding claim 44, Kikuchi, as detailed in claim rejection 41, further discloses that said plurality of divided areas on said photosensitive object are grouped into a plurality of blocks in advance, and the evaluation of said non-

linear component of positional deviation amount of each of said plurality of measurement divided areas is performed with respect to each block (Figure 16, grouping the divided areas on the photosensitive object, or shot areas, before evaluating the non-linear error is an obvious variation of grouping the shots into a block after evaluating non-linear error).

Regarding claim 46, Kikuchi, as detailed in claim rejection 41, further teaches that as said plurality of measurement divided areas on said photosensitive object, only said plurality of specific divided areas can be designated (Figure 5, steps 306 through 320, specific divided areas are measured (8 shots under the normal EGA measurement method) and position coordinates are calculated for all areas).

Regarding claim 47, Kikuchi, as detailed in claim rejection 41, also teaches that as said plurality of measurement divided areas on said photosensitive object, at least a part of remaining divided areas can be designated in addition to said plurality of specific divided areas (Figure 5, steps 308 and 310, all specific divided areas are measured and position coordinates are calculated for all areas).

Regarding claim 48, Kikuchi, as detailed in claim rejection 41, also teaches that said correction information is one of a correction map and a correction function (Figure 9, step 340, and Figure 12, step 412).



For claims 33-35, 41-44, 46-48, and 62 it would have been obvious to one skilled in the art at the time of the invention to have included the capacity of updating correction information with new measurement divided areas and said correction information is updated using non-linear components of position deviation amounts as shown by Irie et al. with the method of calculating positional information errors of Kikuchi since, as shown by Irie et al., the addition of new measurement divided areas to update correction information is commonly done to improve throughput while ensuring accuracy in superposition during a variety of processing conditions while ensuring repeatability in alignment sensing (column 4, lines 61-67).

Apparatus claim 51 is inherent to method claim 33, and apparatus claim 52 is inherent to claim 35. Apparatus claim 56 is inherent to the method of claims 41 and 42, and apparatus claim 60 is inherent to the method claim 48. The apparatus claims 50-52, 54-56, and 60 are thus rejected as explained in the method claim rejections above.

Device manufacturing claim 49 is inherent to the method claim 41 since an exposure method as described above would necessarily be performed either continuously (while one photosensitive object or substrate is exposed) or intermittently (a case in which one photosensitive object is exposed and subsequently another is exposed with an infinitesimal amount of time separating the two exposures). That is, any exposure apparatus performing the claimed method would necessarily be capable of performing the method at times as well

as being in a non-exposing state at times in which the equipment is either preparing operation or just ending operation or in need of maintenance. Thus, the device manufacturing claim 49 is inherent to the method of exposure described above in claim 41.

11. Claim 36, 45, and 53 are rejected under 35 U.S.C. 103(a) as being unpatentable over Kikuchi in view of Irie as applied to claim 31 above, and further in view of Tomimatu (US Patent No. 6,338,925).

Regarding claims 36 and 45, Kikuchi in view of Irie et al., as detailed in claim rejections 31 and 41 respectively above, does not disclose that said intervals are one of intervals of a predetermined number of said photosensitive objects and intervals of a predetermined period of time.

However, Tomimatu discloses intervals that are one of a predetermined number of said photosensitive objects and intervals of a predetermined period of time (Figure 3, step 22, Tomimatu teaches using a predetermined period of time  $T_s$  as predetermined intervals and in column 4, lines 53-57, Tomimatu presents a sampling plan based on lot number, that is, a group of photosensitive objects).

It would have been obvious to one skilled in the art at the time of the invention to have included predetermined time-based intervals as shown by Tomimatu, with the predetermined intervals of performing the method of Kikuchi in view of Irie et al. since it is much more efficient to automate control of

performing alignment calibration than to manually, and possibly needlessly, recalibrate every production lot.

Apparatus claim 53 is inherent to the method as claimed in claim 36 and, and thus are rejected as explained above.

12. Claims 44, 57, and 59 are rejected under 35 U.S.C. 103(a) as being unpatentable over Kikuchi in view of Irie et al. as applied to claim 41 above, and further in view of Umatate (US Patent No. 4,833,621).

Regarding claims 44, 57, and 59 Kikuchi in view of Irie et al., as detailed in claim rejection 41 above, teach the evaluation of said non-linear component of positional deviation amount of each of said plurality of measurement divided areas is performed. However, Kikuchi in view of Irie et al. does not disclose that the plurality of divided areas on said photosensitive object are grouped into a plurality of blocks in advance, and that the evaluation is performed with respect to each block.

However, Umatate does teach that the plurality of divided areas on said photosensitive object are grouped into a plurality of blocks in advance, and the evaluation of said non-linear component of positional deviation amount of each of said plurality of measurement divided areas is performed with respect to each block (column 2, lines 11-16, shots are grouped into blocks and then the blocks are aligned using several points in the block).

It would have been obvious to one skilled in the art at the time of the invention to have included grouping the plurality of divided areas into blocks in advance as shown by Umatate, with the evaluation of non-linear components of positional deviation of Kikuchi in view of Irie et al. since, as shown by Umatate, grouping a plurality of divided areas on a photosensitive object is commonly done to enhance throughput by evaluating and completing alignment operations before substrate processing commences (column 1, lines 47-50). It would have been an obvious extension of the teachings of Umatate to have applied the block alignment method to non-linear corrections as well.

The apparatus claim 57 is inherent to the method claim 44. The apparatus claim 59 is inherent from the methods of claims 44, 46, and 47. Thus, the apparatus claims are therefore rejected as explained above.

13. Claim 58 is rejected under 35 U.S.C. 103(a) as being unpatentable over Kikuchi in view of Irie et al. and further in view of Umatate as applied to claims 44 and 57 above, and further in view of Tomimatu.

Regarding claim 58, Kikuchi in view of Irie et al and further in view of Umatate., as detailed in claim rejections 44 and 57 above, does not disclose that said intervals are one of intervals of a predetermined number of said photosensitive objects and intervals of a predetermined period of time.

However, Tomimatu discloses intervals that are one of a predetermined number of said photosensitive objects and intervals of a predetermined period of time (Figure 3, step 22, Tomimatu teaches using a predetermined period of time

$T_s$  as predetermined intervals and in column 4, lines 53-57, Tomimatu presents a sampling plan based on lot number (a group of photosensitive objects)).

It would have been obvious to one skilled in the art at the time of the invention to have included predetermined time-based intervals as shown by Tomimatu, with the predetermined intervals of performing the method of Kikuchi in view of Irie et al. and further in view of Umatate since it is much more efficient to automate control of performing alignment calibration than to manually and possibly needlessly recalibrate every production lot.

14. Claims 40 and 49 are rejected under 35 U.S.C. 103(a) as being unpatentable over Kikuchi in view of Irie et al. as applied to claims 31 and 41 respectively above, and further in view of Matsumoto et al. (US 2001/0034563 A1).

Regarding claims 40 and 49, Kikuchi in view of Irie et al., as detailed in claim rejections 31 and 41 respectively above, does not disclose a lithographic process wherein in said lithographic process, an exposure processing of a specific process is continuously or intermittently performed to each of a plurality of photosensitive objects using the above disclosed exposure method.

However, Matsumoto et al. teaches a lithographic process wherein in said lithographic process, an exposure processing of a specific process is continuously or intermittently performed to each of a plurality of photosensitive objects (Figure 3, a processing apparatus, apparatus A or K for instance, is able

to perform multiple processing conditions, or specific processes, such as conditions 21 and 13 for apparatus A or conditions 28 or 57 for apparatus K. This means that the particular apparatus must necessarily be either continuously or intermittently processing lots using either one processing condition in the continuous case, or both processing conditions in the intermittent case. Figure 28 shows the grouping of lots by similar processing type and Figure 31 further shows the decision of whether to continue processing one type of lot group or to process a different lot group type based upon a determined priority.)

It would have been obvious to one skilled in the art at the time of the invention to have included the exposure processing of a specific process is continuously or intermittently performed to each of a plurality of photosensitive objects as shown by Matsumoto et al., with the exposure method of Kikuchi in view of Irie et al. since it is very well known in the art that alternately processing a mixture of processing conditions as shown by Matsumoto et al. is commonly done to improve throughput in a manufacturing environment in which individual equipment is used to perform multiple processing conditions.

### ***Conclusion***

15. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure. Irie et al. (US Patent No. 5,808,910) discloses measuring new measurement divided areas if a measurement divided area has particularly

poor nonlinear error. Matsumoto et al. (US Patent No. 6,992,767) discloses an alignment method in which new measurement divided areas are measured when alternative shots are necessary, and the offsets are updated if deemed necessary. Matsumoto et al. (US 2002/0111038 A1) discloses an overlay accuracy improvement method when multiple exposure tools are in-line. Tomimatu (US Patent No. 6,239,858) discloses a method of minimizing non-linear error between multiple process steps and exposure tools. Sato et al. (US Patent No. 5,585,925) discloses an alignment method in which the first wafer of each lot is used to compute the non-linear error adjustments needed. Magome et al. (US Patent No. 5,805,866) discloses an alignment method in which the magnitude and variation are calculated for non-linear error.

16. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Christina Riddle whose telephone number is (571)270-7538. The examiner can normally be reached on Monday- Thursday 7:00-17:30 EST.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Kent Chang can be reached on (571)272-7667. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

cr  
12/2/2006

/Timothy J Thompson/  
Primary Examiner, Art Unit 2873